Amendments to the Specification

Please replace paragraph **[0006]** with the following rewritten paragraph:

[0006] The first object indicated above may be achieved according to a first aspect of the present invention, which provides a lead-free piezoelectric ceramic composition wherein Cu is contained in the form of a solid solution in a crystal structure or at its grain boundary of a perovskite compound of a non-stoichiometric composition represented by a formula $(K_xA_{1-x})_y(Nb_{1-z}B_z)O_3$, such as $K_4CuNb_8O_{23}$, $K_5Cu_2Nb_{11}O_{30}$ and $K_{5.4}Cu_{1.3}Ta_{10}O_{29}$, wherein "A" represents at least one of Na and Bi, while "B" represents at least one of Ta and Ti, and wherein $0 < x \leq 1$, $0 < y < 1$,and $0 \leq z \leq 1$.

Please replace paragraph **[0007]** with the following rewritten paragraph:

[0007] In the lead-free piezoelectric composition of the present invention described above, a total content of the elements $Nb_{1-z}B_z$ in a site B of the perovskite compound is larger than a total content of the elements K_xA_{1-x} in a site A of the perovskite compound, by an amount determined by "y" (A/B site ratio smaller than 1) = total content in the site A/total content in the site B, so that by-products such as $K_aCu_bNb_cO_d$, $K_eCu_fTa_gO_h$ and $K_iCu_jTi_kO_l$ (wherein "a" through "l" are arbitrary numerical values) are produced as a result of reaction of the elements in the site B with Cu, in the process of firing of the perovskite compound. The produced by-products serve to restrict melting and grain growth of ~~$(K_xA_{1-x})(Nb_{1-z}B_z)O_3$~~ $(K_xA_{1-x})_y (Nb_{1-z}B_z)O_2$, thereby promoting the sinterability of the perovskite compound at a sintering or firing temperature in a range in which the amount of volatilization of alkali components is sufficiently small. In particular, partial substitution of Nb by Ta reduces the total content of $(K_xA_{1-x})NbO_3$ having a comparatively low melting point, thereby raising the melting point of the system as a whole, thus making it possible to raise the firing temperature to a level at which the volatilization of the alkali components does not matter, so that the sinterability of the perovskite compound can be further improved. Namely, the present lead-

free piezoelectric ceramic composition can be well sintered in a normal manner, without employing a special forming and firing process such as a hot pressing process. The thus improved sinterability results in intended densification of the sintered body, and the above-indicated by-products desirably serve to enhance the piezoelectric properties of the sintered body. In particular, the partial substitution of Nb by Ta results in a considerable improvement of the dielectric constant of the sintered body. Thus, the present lead-free piezoelectric ceramic composition exhibits excellent piezoelectric properties and has a high degree of efficiency of preparation or fabrication.

Please replace paragraph **[0017]** with the following rewritten paragraph:

[0017] The second object indicated above may be achieved according to a second aspect of this invention, which provides a process of preparing a lead-free piezoelectric ceramic composition, comprising the steps of:

preparing a starting composition including, as a primary component, a perovskite compound represented by a formula $(K_xA_{1-x})(Nb_{1-z}B_z)O_3$, wherein "A" represents at least one of Na and Bi, while "B" represents at least one of Ta and Ti, and wherein $0 < x \leq 1$, and $0 \leq z \leq 1$, and as a secondary component, at least one of compounds $K_aCu_bNb_cO_d$, $K_eCu_fTa_gO_h$ and $K_iCu_jTi_kO_l$, such as $K_4CuNb_8O_{23}$, $K_5Cu_2Nb_{11}O_{30}$ and $K_{5.4}Cu_{1.3}Ta_{10}O_{39}$, wherein "a" through "l" are arbitrary numerical values; and

subjecting the starting composition to a firing treatment.

Please replace paragraph **[0019]** with the following rewritten paragraph:

[0019] ~~In one preferred form of the process of the second~~ The second object may also be achieved according to a third aspect of this invention, ~~the~~ which provides a process ~~step of~~ of preparing a lead-free piezoelectric composition, comprising the steps of: ~~starting composition comprises~~ preparing ~~a mixture consisting of (a)~~ a first starting material ~~as the primary component~~ in the form of a perovskite compound of a non-stoichiometric composition

represented by a formula $(K_xA_{1-x})_y(Nb_{1-z}B_z)O_3$, wherein “A” represents at least one of Na and Bi, while “B” represents at least one of Ta and Ti, and wherein $0 < x \leq 1$,~~wherein~~ $0 < y < 1$ and $0 \leq z \leq 1$, ~~(b)~~ a second starting material ~~as the secondary component~~ serving as a source of Cu~~,~~; and ~~the step of subjecting the starting composition comprises~~ calcining the mixture ~~of the first and second starting materials~~. In this form of the process, the site B ions the amount of which is larger than that of the site A ions react with Cu, so that the above-indicated by-products are produced. Thus, the mere step of mixing the first starting material for the perovskite compound and the second starting material as the source of Cu permits easy preparation of the lead-free piezoelectric ceramic composition having a high degree of sinterability and exhibiting excellent piezoelectric properties. Preferably, the second starting material is CuO.

Please replace paragraph **[0020]** with the following rewritten paragraph:

[0020] In ~~another~~one preferred form of the process of the invention, the secondary component includes one of $K_4CuNb_8O_{23}$ and $K_5Cu_2Nb_{11}O_{30}$, which is to be added to the primary component.

Please replace paragraph **[0028]** with the following rewritten paragraph:

[0028] To prepare the starting composition, there are prepared starting materials in the form of $KHCO_3$ (or K_2CO_3), $NaHCO_3$ (or Na_2CO_3), Nb_2O_5, Ta_2O_5, CuO, etc. The amounts of these starting materials are determined to provide a basic composition represented by a formula $(K_xNa_{1-x})_y(Nb_{1-z}Ta_z)O_3$ (wherein $0 < x \leq 1$, $0.9 < y < 1$, and $0 \leq z \leq 0.4$), and 0.2-1.0 at.% (Cu-equivalent amount) of a compound CuO. Namely, the amounts of the starting materials are determined to provide a perovskite compound represented by ABO_3, such that the amount of site ~~A~~B ions is larger than that of site ~~B~~A ions. Described in detail, values “x”, “y” and “z” in the above-indicated formula and the amount of CuO are determined so that a

sintered body of a lead-free piezoelectric composition prepared from the stating composition exhibits the desired properties, as described below. Then, the starting materials are introduced into a suitable mixer such as a pot mixer, and mixed together for about 24 hours, in a wet-mixing fashion with ethanol used as a disperse medium. Subsequently, a mass of a mixture thus obtained as the starting composition is calcined in an atmosphere, such that the mass is held at a highest temperature of about 900°C for about 5 hours. The uniformity of the composition of the calcined mass can be improved by repeating the mixing and calcining steps indicated above. Then, the calcined mass is dried at about 100°C for about 24 hours. The dried mass is passed through a sieve of about #100 mesh, so that a calcined powder of the starting composition is obtained. In the calcining process, the compound CuO added to the perovskite compound reacts with the site B ions, and by-products such as $K_aCu_bNb_cO_d$ (e.g., $K_4CuNb_8O_{23}$) are produced as a result of the reaction.

Please replace paragraph **[0031]** with the following rewritten paragraph:

[0031] In the lead-free piezoelectric composition according to the present embodiment of the invention, the proportion of the amounts of the individual starting materials of the starting composition is determined such that the total content of the elements $Nb_{1-z}Ta_z$ in the site B of the perovskite compound is larger than the total content of the elements K_xNa_{1-x} in the site A of the perovskite compound, and the suitable amount of CuO is added to the perovskite compound, so that the by-products such as $K_aCu_bNb_cO_d$ and $K_eCu_fTa_gO_h$ are produced as a result of reaction of the elements in the site B with Cu, in the process of calcinations of the perovskite compound. The produced by-products serve to restrict melting and abnormal grain growth of $\cancel{(K_xNa_{1-x})(Nb_{1-z}Ta_z)}$ $\underline{(K_xNa_{1-x})_y(Nb_{1-z}Ta_z)O_3}$ in the process of final firing of the perovskite compound, thereby promoting the sinterability of the perovskite compound, so that the undesirable volatilization of the alkali components and the melting of $KNbO_3$ are restricted, with a result of increasing the density of the sintered

body or structure and thereby improving the piezoelectric properties of the sintered body. Further, partial substitution of Nb by Ta reduces the total content of $(K_xNa_{1-x})NbO_3$ having a comparatively low melting point, thereby raising the melting point of the system as a whole, thus making it possible to raise the firing temperature to a level at which the volatilization of the alkali components does not matter, so that the sinterability of the perovskite compound can be further improved. Furthermore, such partial substitution of Nb by Ta restricts grain growth, thereby easily homogenizing microtexture of the perovskite compound or making it possible to keep microstructure of the perovskite compound under control.